

وزارة الموارد المائية والري

Wadi Excursion Presentation and Details about Mitigation Measures in Safaga Dams

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Introduction:

Arid Regions are characterized by :

- Droughts and desertification; Water scarcity;
- Dry wadis, Seasonal rainfall storms and runoff events (Flash Flood);
- Non available meteorological and hydrological data;
- Water problems due to climatic conditions and socio-economic factors;
- Non efficient utilization and management of the water resources;
- Non development projects.



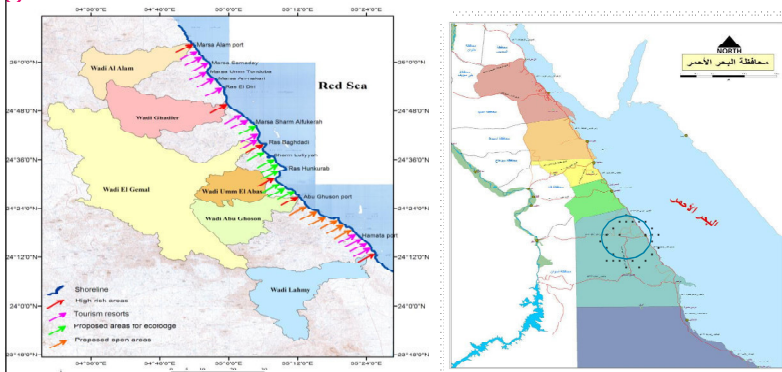
Flash Flood

A flash flood is a flood of short duration and abrupt rise with relatively high peak rate of flow, usually resulting from a high intensity of rainfall over a small area.



Flash Flood

- ❖ Red Sea Governorate has indefinite numbers of valleys that come from Red Sea Chain Mountains and end at the Red Sea (Spring and autumnal Equinoxes) .
- ❖ All cities and villages of RSG are in the valleys ends.
- ❖ All infrastructures are in mouths of valleys.



Flash Flood

The resulting runoff is from:

- A rainfall of very high intensity and short duration;
- Basin's drainage network of steep slopes;
- Mountainous areas;
- Non-permeable upper layers of the basin and streams (low infiltration losses);
- Non-geologic structured basins.



Flash Flood

The runoff collects in low-lying areas and flows rapidly downhill. As a result, anything in its path is suddenly in rising water. These most often occur in dry areas that have recently received precipitation, but the flash flood can flow for a long distance as long as there is a downhill path



Flash Flood

Flash floods are considered the most dangerous kind of floods because they combine the destructive power of a flood with incredible speed and unpredictability. They are extremely dangerous because of their sudden nature. They usually happen at night.



Flash Flood

Artificial flash floods They are caused by structural failures. For example, **dam-break flash floods** arise when a storm occurs with a magnitude over and above the design limits on the structure or because of a failure in dam construction. **In this case their kinetic energy is great and transport capacity is strong.**



Flash Flood

Flash flood waters move at very fast speeds and can kill people, roll boulders, tear out trees, destroy buildings, obliterate bridges and increase the potential for landslides and mudslides



Flash Flood

During the last few decades flash floods have constituted one of the deadliest and costliest natural disasters which can occur almost everywhere in the world. As a result of this, great attention has been devoted to flash floods in recent times.



In RSG, several flash floods occurred during 1979,1987,1990,1991,1994,1996, 1998, 2010, 2012, 2013, 2014,2015 . Hundreds of people were killed, many buildings, roads, infrastructures were destroyed, Thousands of people left their homes and work. Water pipe line stopped working, Electric stations broke down. Millions of pounds were lost.

Factors Affecting Flash Flood

1- Meteorological Characteristics:

- Rainfall; Temperature; Humidity; Wind speed and direction; Evaporation.

2- Storm Characteristics:

Seasons; Intensity and Duration; Antecedent precipitation; Frequency; Areal or spatial distribution of the storm; Direction of the storm movement.

3- Basin Characteristics:

- Size, shape, slope; Altitude; Topography; Geology; Land use / vegetation; Drainage network; Orientation.

Measures to Deal with Flash Floods

Prevention



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Mitigation



Avoidance



Prevention

Prevent people to build any construction in valleys

Pre-planning projects and cities away from flood channels.

Controlling flood water up stream valleys.

Avoidance

Construct roads near mouth of the valleys

Build transfer canals to convey flood water away from infrastructures.

Using early alarm or modern warning systems.

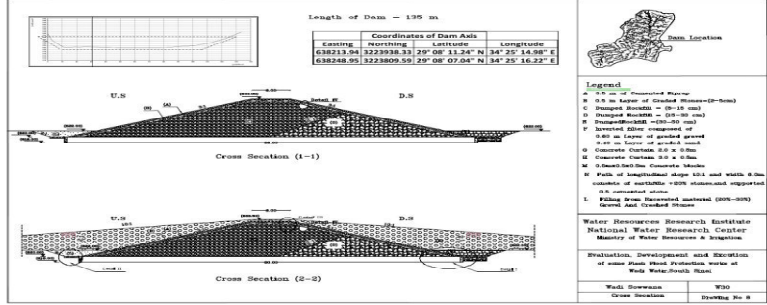
Mitigation

Constructing protecting dams

Constructing artificial lakes to collect flash flood water.

Making road protection to prevent road pavement collapsing

Case study- Dams and Lakes



Case study- Dams and Lakes

Abou-Maya protecting dam

- * Dam Location : 23 km west Safage.
- * Length : 100 m
- * Height : 5 m
- * Capacity : 120000 m3.
- * Con. date: 12/5/2005



El-Baroud El-Abyad 1 protecting dam

- * Dam Location : 10 km west Safaga.
- * Length : 110 m
- * Height : 10 m
- * Capacity : 1200000 m³.
- * Con. date: 7/7/2007



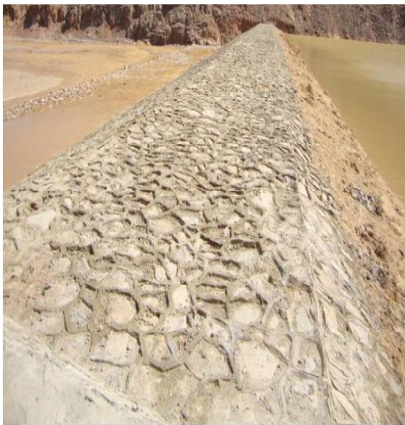
El-Baroud El-Abyad 2 protecting dam

- * Dam Location : 10 km west Safaga.
- * Length : 145 m
- * Height : 5 m
- * Capacity : 175000 m³.
- * Con. date: 20/2/2008



Wadi Safaga protecting dam

- * Dam Location : 15 km south Safaga.
- * Length : 150 m
- * Height : 5 m
- * Capacity : 210000 m³.
- * Con. date: 12/10/2010



Wadi Gasous protecting dam

- * Dam Location : 20 km south Safaga.
- * Length : 150 m
- * Height : 5 m
- * Capacity : 210000 m³.
- * Con. date: 2/7/2011



Wadi El-Nakheel (M1) protecting dam

- * Dam Location : 4 km west El-Quseir.
- * Length : 115 m
- * Height : 2.5 m
- * Capacity : 40000 m³.
- * Con. date: 1/1/2013



Wadi El-Nakheel (M2) protecting dam

- * Dam Location : 3.5 km west El-Quseir.
- * Length : 175 m
- * Height : 2.5 m
- * Capacity : 45000 m³.
- * Con. date: 1/1/2013



Wadi El-Nakheel (M3) protecting dam



- * Dam Location : 3 km west El-Quseir.
- * Length : 235 m
- * Height : 2.5 m
- * Capacity : 60000 m3.
- * Con. date: 1/1/2013

Wadi El-Nakheel (B2) Lake



- * Lake Location : 6 km west El-Quseir.
- * Length : 500 m
- * Width : 225 m
- * Height : 5.6 m
- * Capacity : 400000 m3.
- * Con. date: 13/3/2015

EL-Sheikh El-Shazely Dam (under construction)



- * Dam Location : 500 km South Hurghada.
- * Length : 200 m
- * Height : 10 m
- * Con. date: in advance



Wadi Alm (B2) Lake



- * Lake Location : 6 km west Marsa Alam city
- * Length : 500 m
- * Width : 225 m
- * Height : 5.6 m
- * Capacity : 400000 m3.
- * Con. date: In advance



Assessment

- ❖ On March 17, 2014, A flash flood occurred in Safaga city.
- ❖ Wadi safaga dam stored all water. No losses happens.
- ❖ The water level reached up to the crest of the dam.



Assessment

- ❖ As mention in previous slides, Red Sea Governorate has length of 1080 km.
- ❖ There are infinite numbers of wadies pass through its cities an villages.
- ❖ The flash floods become severe and frequently increase.
- ❖ Many people killed , infrastructures destroyed, buildings and equipment and money lost.
- ❖ Only a few dams and lakes were constructed in RSG.
- ❖ The constructions for protecting cities and strategic areas do not enough.
- ❖ Most cities and villages have not been protected yet.
- ❖ There is a lack of budget to execute more protection project.
- ❖ Possibility of using flash flood water is still far away.

Recommendations

- ❖ All cities and villages should be protected.
- ❖ All tourist villages and bays should be protected too.
- ❖ Budget should be provided to execute and implement the plan of MWRI for protecting Red Sea cities.
- ❖ Building in Wadies should be banned and prohibited.
- ❖ Electric and water supply stations and units should be built outside the valleys and be highly protected.
- ❖ All friend countries should help to complete the protection project.
- ❖ Harvesting of flash flood water should be taken into consideration.

Excursion Program

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|---|---------------|
| Moving from El-Guna To Safaga Dams (100 km) | 12:00 – 13:15 |
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| Visiting Abou-Maya dam. | 13:15 – 13:45 |
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| Moving to El-Baroud El-Abyadd dams.(15 km) | 13:45 – 14:00 |
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| Visiting El-Baroud El-Abyadd dams. | 14:00 – 14:45 |
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| Returning to El-Guna City.(100 km) | 14:45 – 16:00 |

